

Claims

1. A method for manufacturing a solid ammonium phosphate and/or urea ammonium phosphate product from a solution containing urea and phosphoric acid, characterized in that
 - 5 a) the solution containing urea and phosphoric acid is heated by mixing in order to evaporate water and to decompose the urea into carbon dioxide and ammonia;
 - b) the formed carbon dioxide is removed;
 - c) the formed ammonia is used to neutralize the phosphoric acid in the solution, and
 - 10 d) the formed ammonium phosphate and/or urea ammonium phosphate suspension is further processed to form a solid ammonium phosphate and/or urea ammonium phosphate product.
2. A method according to Claim 1, characterized in that in the solution containing urea and phosphoric acid, the molar ration of the nitrogen of the urea and
15 the phosphor of the phosphoric acid (N/P) is > 0.85 .
3. A method according to Claim 1 or 2, characterized in that the solution containing urea and phosphoric acid is the mother liquid of a urea phosphate process.
4. A method according to Claims 1 to 3, characterized in that solid matter, such
20 as carbonate, sulphate, and oxide of alkali metals or alkaline earth metals and/or chloride, is added to the reaction mixture to partly neutralize the solution, to bind water and/or to add nutrients to the end product.
5. A method according to Claim 1, 2 or 4, characterized in that the solution containing urea and phosphoric acid is the scrubber solution of a urea-based NPK
25 process, which contains or to which has been added phosphoric acid.
6. A method according to Claims 1 to 5, characterized in that the solution containing urea and phosphoric acid is heated at 50-125 °C.
7. A method according to Claim 6, characterized in that said solution is heated until the moisture of the formed suspension is 15-20%.

8. A method according to Claim 6 or 7, characterized in that said solution is heated until the pH of the suspension is 2.5-7.
9. A method according to Claim 6, 7 or 8, characterized in that the solution is heated until the molar ratio of the nitrogen of the ammonia and the phosphor of the phosphate (N/P) in the suspension is about 0.1-1.5 : 1.
10. A method according to Claims 1 to 9, characterized in preferably being continuous and diphasic: in the first phase, water is evaporated in one or more reactors at about 100 °C, until the moisture of the formed suspension is < 20% and the pH is 3-5 and, in a second phase, evaporation is continued in one or more reactors at about 110-115 °C, until the moisture of the suspension is < 10% and its pH is about 6-6.5.
11. A method according to Claims 1 to 10, characterized in that the product suspension containing ammonium phosphate and/or urea ammonium phosphate is solidified in the form of a layer of 1-30 mm, preferably 10mm in thickness, spread on a sheet-iron belt conveyor, which can be heated and/or cooled, and which is heated and/or cooled for 0.01-2 hours, preferably at a retention time of 0.05-0.5 hours to a final temperature of < 50 °C.
12. A method according to Claims 1 to 11, characterized in that the solidified end product is dried, crushed, ground and/or granulated.
13. A solid ammonium phosphate and/or urea ammonium phosphate product, characterized in being manufactured by the method according to any of the preceding Claims.
14. The use of the urea phosphate product according to Claim 13 as a fertilizer either as such or as a component of a mixed fertilizer.
15. A method according to Claim 3, characterized in that the solution containing urea and phosphoric acid is heated at 100-115 °C.
16. A method according to Claim 3 or 15, characterized in that the solution containing urea and phosphoric acid is heated until the moisture of the formed suspension is < 10%.
17. A method according to Claim 3, 15 or 16, characterized in that the solution is heated until the pH of the suspension is 4-6.5.

18. A method according to any of Claims 3, 15-17, characterized in that said solution containing urea and phosphoric acid is heated until the molar ratio of the ammonia nitrogen and the phosphate phosphor (N/P) in the suspension is about 0.85-1.5:1, preferably 1.3-1.4:1.

5 19. A method for the simultaneous manufacture of urea phosphate and a solid ammonium phosphate and/or urea ammonium phosphate product, in which the urea phosphate is manufactured by any known method, characterized in that the solid ammonium phosphate and/or urea ammonium phosphate product is manufactured from a solution containing urea and phosphoric acid so that:

- 10 a) the solution containing urea and phosphoric acid is heated by mixing in order to evaporate water and to decompose the urea into carbon dioxide and ammonia, and
- b) the formed carbon dioxide is removed, and
- c) the formed ammonia is used to neutralize the phosphoric acid in the solution,
15 and
- d) the formed ammonium phosphate and/or urea ammonium phosphate suspension is further processed to form a solid ammonium phosphate and/or urea ammonium phosphate product.